Interactive comment on "Testing the realism of a topography driven model (FLEX-Topo) in the nested catchments of the Upper Heihe, China" *by* H. Gao et al.

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Dear Reviewer 2,

Thank you for your efforts and valuable contribution to our manuscript. We very much appreciate your comments and suggestions. We shall improve the manuscript based on your suggestions and comments.

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Comment: The conclusions that FLEX-T is better transferrable than the other models is most likely correct, but is based on the results from only two sub-catchments. Some

more considerations of the validity of the results would be recommended.

Answer:

In the reply to Reviewer 1, we did additional test to distinguish the effect of model complexity on model performance. It showed that landscape classification is essential to be included in model transfer. However, we will make it clearer in the revised manuscript that, at this point, the interpretation is only valid in the study catchment and that subsequent studies will to test this hypothesis further in other regions in order to evaluate the generality of the findings.

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Comment: The water balance on page 83-84 should be in a table.

Answer:

Thank you for your suggestion. We already showed the water balance in figure 10. In this paragraph, we would like to illustrate and explain all the modelled fluxes. Another table would repeat the same results as shown in the figure.

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Minor comments:

P64 L9 "accounts for" means "explains". Is this correct here?

Answer:

We changed into 'it takes spatial variable forcing into account'.

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P64 L14 "evaluated at two nested sub-catchments" - or "evaluated for two upstream sub-catchments"

Answer:

We shall make this correction in the final version.

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P68 L15 Is the average snow amount valid for the stations or for the catchment? I guess there is more snow higher up, this should be clarified.

Answer:

It is for the catchment average snow amount. We shall make this clearer.

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P69 L10-15 It would be good to know the typically size of terraces (width between steps, step size)

Answer:

Here terrace is not defined exactly as in agriculture. It is rather defined as a landscape unit which is higher above the nearest stream (and thus arguably higher above the groundwater table) than a wetland, but, in contrast to hillslopes, exhibiting low slopes. It can be seen aas a landscape element that connects the wetland and the hillslope. In dry seasons, it is free of water, but in flood periods, it may be inundated. So typically, it is hard to measure the width between steps and step size.

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P71 L2 I guess it is "cloud free" LANDSAT images

Answer:

You are right. We shall change correspondingly.

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P75 L7 change "where" to "and"

Answer:

We shall make this correction in the final version.

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P76 L15 I am not sure if "parallel modeling units" is a clear concept. Consider rewriting.

Answer:

We shall make this correction in the final version.

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P76 L15 Table 4 does not show that the Tlag-parameters represent the lag times.

Answer:

This is the prior parameter range. We could not get any estimation for the prior parameters' range. We just set a large range of parameter sets, and let the automatic calibration algorithm find the optimal parameters.

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P82 L8-9 "when tested : : : sub-catchments" can be removed

Answer:

We shall make this correction in the final version.

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P82 L15-16 "did not produce any peak flow in all three" - consider rewriting

Answer:

We shall make this correction in the final version.

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P86 L13 and 16 "reason for overestimation" is probably better

Answer:

We shall make this correction in the final version.